

REMARKS

The courtesy of Examiners Genco and Christensen to grant applicant's attorney a telephone interview on March 25, 2004 is noted with appreciation. The amendments to the claims and remarks provided herein are consistent with the discussion during that interview. Specifically, the amendments clarify that orientation of the diaphragm and the light sensing regions coincide.

Claims 1-14 are pending in the application; the status of the claims is as follows

Claims 1-3, and 8-10 are rejected under 35 U.S.C. § 103(a) over Koide, U.S. Pat. in view of Sugiyama, U.S. Pat. No. 5,365,307 further in view of Hokari, U.S. Pat. No. 5,654,565; and

Claims 1-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hokari in view of Shiobara, JP(A) No. 6-186622. It is noted that only the abstract of Shiobara is provided in English.

Objection to the Drawings

Applicants note the indication in the Office Action that the Examiner has objections to the drawings under 37 C.F.R. § 1.83(a). To address this matter, applicants have amended the specification to clarify the description of the drawings.

For example, with respect to Fig. 5, the original specification described the diaphragm as being "linear in the vertical direction" While the examiner may, for example, have interpreted this to be saying that the vertical "extents" of the diaphragm were linear (even though Fig. 5 shows the top and bottom as being curved) what was actually intended was that the vertical "edges" (left and right sides in Fig. 5) are linear.

Similarly, again with respect to Fig. 5, the original specification described this diaphragm as being "circular in the horizontal direction." What is actually meant here is that the horizontal edges (i.e., the top and bottom edges in Fig. 5) are circular.

By this amendment, applicants have amended the specification on pages 6 and 9 to make clear that the linear and circular references were to the “edges” of the diaphragm.

Accordingly, in view of these amendments to the specification, the drawings and specification are now clearly consistent thereby obviating any changes to the drawings. Accordingly, in view of these changes, applicants respectfully request that the objection to the drawings be withdrawn.

Objection to the Specification

Applicants also note the indication in the Office Action that the Examiner has objections to the specification. Applicants respectfully traverse this objection based on the following.

The objection states, *inter alia*, that “Applicant is using the term light restricting plate as a broad term which encompasses the structure of a diaphragm.” The Examiner also states that “the terms ‘vertical’ and ‘horizontal’ were inadvertently reversed in the specification.”

As noted above with respect to the objection to the drawings, by this amendment, applicants have amended the specification on pages 6 and 9 to make clear that the linear and circular references were to the “edges” of the diaphragm, which should clear up any uncertainty as to what shape is vertical and what shape is horizontal and should also, thereby, obviate any concern that the terms ‘vertical’ and ‘horizontal’ were inadvertently reversed in the specification.

Also by this specification, applicants have amended page 9 to clarify that it is the diaphragm which is oval shaped. While applicants believe that the terms light restricting plate and diaphragm, if used generically, may be interchangeable, in the embodiment described in the specification on page 9 it is the light restricting plate which is oval shaped.

Accordingly, applicants respectfully request that the objection to the specification be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections

- a. Rejection of claims 1-3 and 8-10 over Koide, Sugiyama and Hokari

The rejection of claims 1-3, and 8-10 under 35 U.S.C. § 103(a), as being unpatentable over Koide in view of Sugiyama and further in view of Hokari, is respectfully traversed based on the following.

The examiner's thoughtful comments and helpful clarifications in response to applicant's previous submission are noted with appreciation. As will be explained in the following, applicants respectfully maintain that the cited references do not disclose, suggest or teach the invention of claims 1 or 8, or the claims which depend therefrom.

As noted previously, and as the Examiner has correctly understood, claim 1 requires the following:

An image pickup device comprising:
an image sensor having rectangular light receiving portions arranged in a matrix, and microlenses disposed in correspondence with said light receiving portions, said light receiving portions and said microlenses being formed integrally with each other; and
an image input optical system for forming an image on said image sensor, said image input optical system including a diaphragm;
wherein the diaphragm has a shape in a vertical direction that coincides with a shape of said light receiving portions of said image sensor, said diaphragm restricting light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor.

Thus, claim 1 requires an image pick up device with several components including, *inter alia*, a diaphragm where the opening in the diaphragm has a shape in a vertical direction which corresponds to the shape of the light receiving portions of the image

sensor. Claim 1, as now presented, also requires that the shape of the diaphragm be such that it restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of said image sensor.

By way of summary, it is applicant's understanding that the examiner has cited Koide as teaching a shape of a stop and the effect this stop supposedly has on the shape of the laser spot which is formed. Similarly, Sugiyama and Hokari are cited for the proposition that the scanning surface 107 of Koide could be replaced by a sensor (Sugiyama) and that the sensor could have integral microlenses (Hokari).

Applicants also take the point raised by the Examiner that it is not sufficient to argue references individually. However, it is respectfully pointed out that it is necessary to examine each reference to determine what the reference does and does not disclose and thus whether every limitation of the claim is disclosed somewhere between and among the various references.

As previously noted, Koide discloses a laser scanning apparatus, such as would be used for a laser printer which has a stop 4 that is used to sharpen the point of laser light. As Koide explains, normally a laser beam has a Gaussian distribution cross-section (col. 1, line 48); *see also* Fig. 4. However, by passing the beam through stop 4, the beam can be sharpened (*i.e.*, the intensity of the beam near the edge of the beam can be made to drop off more abruptly) to have a Bessel distribution:

Ideally when the light intensity distribution on the image carrier is a Bessel distribution, the beam spot diameter (*i.e.*, a width at which the light intensity is decreased to $1/e^2$ with respect to a peak of 1) is minimized. That is, high-precision optical scanning can be performed.
(col. 1, lines 63-67; *see also* Fig. 5).

Thus, the teaching of Koide is that a sharpness of the laser spot can be increased by passing the laser beam through the stop.

As acknowledged, Koide does not disclose any image sensor. Instead, Koide has a scanning surface 107 which is scanned by the laser beam. This surface is simply a curved plane. Thus, a fundamental distinction between the claimed invention and Koide is that the shape of the sharpened laser beam in Koide does not correspond to the shape of the surface 107 nor does it correspond to the shape of anything else. Instead, the shape of the laser beam only corresponds to the shape of the laser spot which the laser beam forms when it strikes the surface. Accordingly, Koide can not provide a suggestion or motivation to adapt the shape of the laser beam to the shape of a surface or sensor. This comment is offered not to merely argue Koide individually but, instead, to show the first step in a trend which is that none of the references suggest this limitation.

Koide also fails to disclose or suggest that the shape of the diaphragm be such that it restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of said image sensor.

Sugiyama discloses a microfilm system and suggests that a photosensitive drum thereof could be replaced with an image sensor. This suggestion, however, is general and does not say what type of sensor could or should be selected. For example, Sugiyama is silent on any characteristics of the image sensor and provides no suggestion as to size or shape, etc. of the sensor or as to size or shape, etc. of the elements of the sensor. Similarly, Sugiyama is silent as to any changes, adaptations, refinements or alterations to its optical system which might be needed, or desired, should the photosensitive drum be replaced with an image sensor.

Because Sugiyama does not specify what type or variety of sensor might be or should be chosen, there can be no suggestion taken from Sugiyama that any particular type should be chosen or that the sensor elements of any sensor should be evaluated for suitability for size, shape, etc. relative to specific structures in the optics.

For example, following the teaching of Sugiyama, one who was motivated to replace a laser scanning surface with a sensor might select the sensor disclosed in U.S. Pat.

No. 5,675,158, entitled “*Linear Solid State Imaging Device With Trapezoid Type Photodiodes*.” Because the Sugiyama system is a scanning laser system the choice of a linear imaging device might be suggested. However, in the ‘158 patent, the sensor elements ***do not correspond to the shape of the stop 4 of Koide***. Instead, the sensor elements have the shape of a trapezoid. Thus, the suggestion of Sugiyama to replace the scanning surface with a sensor ***does not*** necessarily lead to a system where the shape of the sensor elements matches the shape of the stop in the optics. Instead, taking the suggestion of Sugiyama it would appear just as likely to result in a system where the shapes, if present, would not match.

“The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” MPEP §2143.01 It is respectfully submitted that a reason why, in the present rejection, the shape of the stop 4 of Koide and the shape of the sensor element of Hokari happen to match is because Koide and Hokari were ***specifically selected*** from among numerous possibilities based on improper use of hindsight gained from the present specification. Because the cited references do not acknowledge or suggest the desirability of having the shape of the sensor elements match the shape of the stop in the optics, it is improper to go searching for specific references, from among many references, based on this criteria.

At the Court of Appeals of the Federal Circuit has recently stated, “Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the [claimed] invention.” *Crown Operations International, Ltd. v. Solutia Inc.*, 289 F3d 1367 (Fed. Cir. 2002). This decision follows many earlier and consistent decisions. For example, the Federal Circuit also proclaimed, “Care must be taken to avoid hindsight reconstruction by using ‘the patent [application] as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims...’ ” *Grain Processing Corp. v. American Maize Products Corp.*, 840 F.2d 902 (Fed. Cir. 1988).

Thus, even though Koide shows stop 4 in the laser path, and even though Sugiyama suggests replacing a laser scanning surface with a sensor, there is no suggestion to choose a particular sensor, such as Hokari, to match stop 4. Alternatively, there is no suggestion to choose a particular optics system with a stop, such as Koide, to match the sensor shape of Hokari.

Even if these references are combined, there is no suggestion in either reference (either taken singly or in combination) to disclose or suggest that the shape of the diaphragm be such that it restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of said image sensor.

Accordingly, because there is no suggestion to combine *these specific references*, these references are unable to render claim 1 obvious. Claims 2 and 3 depend from claim 1 and are thus nonobvious over the cited references for at least the same reasons as claim 1. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

Claim 8 recites an input optical system for use with a particular type of sensor where the sensor has particular shape of light receiving portions. Claim 8 requires that a diaphragm of the optical system has a shape which coincides in a vertical direction with the shape of the light receiving portions of the sensor. Claim 8, as now presented, also requires that the shape of the diaphragm be such that the diaphragm restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor.

As discussed above, the cited references, whether taken singly or in combination, fail to disclose, suggest or teach an optical system where the shape of a diaphragm and the shape of an image sensor intended to be used with the optical system are the same or that the shape of the diaphragm be such that the diaphragm restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor. For these reasons, the references are unable to render claim 8 obvious.

Claims 9 and 10 depend from claim 8 and are thus nonobvious over the cited references for at least the same reasons as claim 8.

Accordingly, it is respectfully requested that the rejection of claims 1-3, and 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Koide in view of Sugiyama and further in view of Hokari, be reconsidered and withdrawn.

b. Rejection of claims 1-14 over Hokari and Shiobara

The rejection of claims 1-14 under 35 U.S.C. § 103(a), as being unpatentable over Hokari in view of (the English language abstract of) Shiobara, is respectfully traversed based on the following.

As noted above, claim 1 requires, *inter alia*, that “the diaphragm has a shape . . . that coincides with a shape of said light receiving portions of said image sensor.” Claim 1 now also requires that the shape of the diaphragm be such that it “*restrict[s] light along a horizontal direction to prevent the light from being incident outside the light receiving portions of said image sensor.*”

The English language abstract and drawings of Shiobara disclose a lens barrel assembly for a camera, the operation of which “is interlocked with the retreating operation of a light shielding member.” While the full disclosure of Shiobara is not clear, because it is not in English, it appears that light shielding members 4 may partially block an opening near the lens system. It is not apparent, in fact, whether these light shielding members 4 actually intrude at all into the light ray bundle which is formed by the optic system.

The present rejection—like the rejection over Koide, Sugiyama, and Hokari—appears to suggest that because a particular optical reference can be found with a rectangular obstruction, claim 1 would be obvious. However, as discussed fully above, in order to render a claim obvious, the references themselves must suggest the combination of references and claimed invention as a whole. Thus, the idea upon which the present

rejection is based—that the existence of a sensor suggests the addition of a lens to that sensor—cannot be extended to the idea that a sensor having square pixels suggests a lens having a square diaphragm, or vice versa.

Here, the English language abstract and drawings of Shiobara do not disclose, suggest or teach that the light shielding members 4 form an opening which corresponds to the shape of the sensor element, or that such a relationship would be desirable in the first place. Similarly, as also discussed above, Hokari fails to disclose, suggest or teach that light receiving portions of the image sensor should have a shape which corresponds to a shape of a diaphragm in an optical system. Thus, there is no suggestion that these two references can be combined to suggest the invention of claim 1.

Instead, Shiobara appears to have been selected from among countless possible references solely because the shape of the opening was rectangular and would thus match the sensor element shape. In other words, the only reason that Shiobara was identified is because the present specification and claims defined what to look for.

As discussed at length above, using the claims and specification as a blueprint for selecting specific prior art references from among many references to formulate an obviousness rejection is the very essence of impermissible hindsight.

Even if these references are combined, there is no suggestion in either reference (either taken singly or in combination) to disclose or suggest that the shape of the diaphragm be such that it restricts light along a horizontal direction to prevent the light from being incident outside the light receiving portions of said image sensor.

Because the cited references fail to suggest their specific combination, claim 1, these references are unable to render claim 1 obvious. Claims 2 and 3 depend from claim 1 and are thus nonobvious over the cited references for at least the same reasons as claim 1.

Claim 4 requires, *inter alia*, “wherein the light restricting plate has a shape in a vertical direction that coincides with a shape of said light receiving portions of said image sensor, said light restricting plate restricting light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor, said light restricting plate being provided separately from said diaphragm.”

As discussed above with respect to the rejection of claim 1, there is no suggestion to combine Hokari and Shiobara for the purpose of matching the sensor element shape to a stop or diaphragm shape, or to prevent the light from being incident outside the light receiving portions of the image sensor, except for hindsight gained from the current specification and claims. Accordingly, Hokari and Shiobara are unable to render obvious the invention of claim 4 which requires that the light receiving portions of the image sensor have a shape in a vertical direction which coincides with the shape of a light restricting plate.

Because the cited references fail to suggest their specific combination, claim 4, these references are unable to render claim 4 obvious. Claims 5-7 depend from claim 4 and are thus nonobvious over the cited references for at least the same reasons as claim 4.

Claim 8 requires, *inter alia*, “. . .an image sensor which has rectangular light receiving portions arranged in a matrix, and . . .a diaphragm whose shape in a vertical direction coincides with a shape of said light receiving portions of said image sensor” and that the shape of the diaphragm be such that the “diaphragm restrict[s] light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor.”

As discussed above with respect to the rejection of claims 1 and 4, there is no suggestion to combine Hokari and Shiobara for the purpose of matching the sensor element shape to a stop or diaphragm shape, or to prevent the light from being incident outside the light receiving portions of the image sensor, except for hindsight gained from the current specification and claims. Accordingly, Hokari and Shiobara are unable to

render obvious the invention of claim 8 which requires that the light receiving portions of the image sensor have a shape which coincides with the shape of a diaphragm.

Because the cited references fail to suggest their specific combination, claim 8, these references are unable to render claim 8 obvious. Claims 9 and 10 depend from claim 8 and are thus nonobvious over the cited references for at least the same reasons as claim 8.

Claim 11 requires, *inter alia*, “a light restricting plate whose shape in a vertical direction coincides with a shape of said light receiving portions of said image sensor, said light restricting plate restricting light along a horizontal direction to prevent the light from being incident outside the light receiving portions of the image sensor, said light restricting plate being provided separately from said diaphragm.”

As discussed above with respect to the rejection of claims 1 and 4, there is no suggestion to combine Hokari and Shiobara for the purpose of matching the sensor element shape to a stop or diaphragm shape, or to prevent the light from being incident outside the light receiving portions of the image sensor, except for hindsight gained from the current specification and claims. Accordingly, Hokari and Shiobara are unable to render obvious the invention of claim 11 which requires that the light receiving portions of the image sensor have a shape which coincides with the shape of a light restricting plate.

Because the cited references fail to suggest their specific combination, claim 11, these references are unable to render claim 11 obvious. Claims 12-14 depend from claim 11 and are thus nonobvious over the cited references for at least the same reasons as claim 11.

Accordingly, it is respectfully requested that the rejection of claims 1-14 under 35 U.S.C. § 103(a) as being unpatentable over Hokari in view of Shiobara, be reconsidered and withdrawn.

Application No.: 09/377,667
Amendment dated July 28, 2004
Reply to Office Action of January 30, 2004

In view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are respectfully requested.

This Amendment increases the number of independent claims by 2 from 4 to 6 and increases the total number of claims by 2 from 14 to 16 (20 claims previously paid for), but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$172.00 to be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

Any fee required by this document other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

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Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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